



ORYX GTL EXCELLENCE PROGRAM

SUMMARY OF QATARI STUDENT
WORK AND CONTRIBUTIONS

REVIEW OF THE ORYXGTL EXCELLENCE PROGRAM

TAMUQ in collaboration with founding supporter ORYX GTL has launched the program on October 20th, 2015, to prepare highly skilled engineers and technical staff needed to lead and operate Qatar's world-class industrial facilities

Advance Qatar's leading role in GTL field and excellence program in natural gas processing for value-added chemicals and fuels.

Develop courses/programs in the area of GTL as well as synthetic fuels characterization and processing. Provide professional services and training courses within Qatar in areas relevant to GTL.

Support Qatar's 2030 vision in building human and research capital in the clean energy field.

Service and research

- Formulate and characterize GTL synthetic fuels and chemicals
- Develop new generation products from ORYX GTL syn-crude
- Investigate techno-economic assessments of GTL related products and processes

Teaching, and training

- Develop special courses and training programs within TAMUQ
- Establish student internship programs in ORYX GTL
- Enhance student research experiences in TAMUQ
- Establish special GTL programs for graduate students of TAMUQ
- Support ORYX GTL recruitment efforts

Community service

- Support ORYX GTL Community Awareness Programs about GTL and the global search for cleaner Vision





TEACHING & COMMUNITY OUTREACH PROGRAMS

ORYX GTL
المرکز للبحوث الغاز الى السائل المحدودة
ORYX GTL Limited

TEES
GAS & FUELS
RESEARCH CENTER
TOTAL ADAM ENGINEERING EXPERIMENT STATION

ORYX GTL
Gas-to-Liquid
Excellence
Program

SUMMER ENGINEERING ACADEMY PROGRAM

28JUNE - 9JULY 2015

❖ Four high school students participated in this program in our Fuel characterization lab (FCL). The two weeks program aimed to familiarize the prospective students with gas and fuels technology. The program (see attachments) included hands-on engineering activities and experiments.



Microsoft Word
Document



Microsoft Word
Document

❖ **Upon completion of this Program, students learned about:**

- Characterizing liquid fuels from different sources (conventional and renewable fuels)
- Fuel properties
- Blending of fuels to achieve targeted property enhancements

SUMMER ENGINEERING ACADEMY PROGRAM

28 JUNE - 9 JULY 2015



ORYX GTL SCHOOL & COMMUNITY ORIENTATION PROGRAMS



The TEES Gas and Fuels Research Center (GFRC), under the umbrella of the ORYX GTL Gas-to-Liquid Excellence Program, launched an outreach program to educate middle and high school Qatari students about the role of natural gas in the global energy market. The program presents simple models to students about the technologies used for natural gas utilization in Qatar. GFRC researchers visited the Arrazi Elementary School, Al Wakrah Girls Preparatory school, Tariq bin Ziyad Secondary School and Gharnata Girls Preparatory school of 2016 (see copy of brochure used in the program).

ORYX GTL Excellence Program

Qatar has vast natural gas reserves and hosts the most advanced existing plants and refineries in gas-to-liquid (GTL) technology and liquefied natural gas (LNG), as well as several chemical and petrochemical plants.

This unique environment motivated Texas A&M at Qatar to produce skilled researchers and engineering graduates in a field of national interest to Qatar, the region, and the world. The ORYX GTL - Gas-to-Liquid Excellence Program aims to prepare the highly skilled engineers and technical staff needed to lead and operate Qatar's world-class industrial facilities.

Mission

To educate and prepare students for national and international leadership roles in industry, government, and academia; to attract top students to chemical engineering; to define and develop new directions in chemical engineering fundamentals and practices, and in chemical engineering education and curricula; to be a valuable resource and service base; and to provide leadership in solving problems of social and economic importance.

Vision

To be a high-impact program continuously advancing the art and science of chemical engineering through creation and dissemination of knowledge.



About GTL at Texas A&M at Qatar

The Nasser Elshorbagy's research team is establishing a world-class research foundation in order to build a state-of-the-art center of excellence in gas processing, petrochemicals and catalysis areas. The team's major accomplishment in the GTL area involves the creation of the Texas A&M Fuel Characterization Lab, one of the most advanced regional labs in this field. The lab plays a critical role in supporting the formulation and marketing of synthetic fuels and chemicals that Qatar produces. To achieve this, lab researchers design new fuel blends and advanced reactor technologies to improve the characteristics and market value of synthetic fuels and value-added chemicals obtained from natural gas.

لبنة من تحويل الغاز إلى سوائل في جامعة تكساس إي أند أم في قطر

يعمل الفريق البحثي برئاسة الدكتور ناصر الشورباغى على إقامة مؤسسة بحثية عالمية المستوى بهدف إنشاء مركز متطور للتحقيق في مجالات معالجة الغاز والبتروكيماويات والتحفيز. ويتعلق أهم إنجازات الفريق البحثي في مجال تحويل الغاز إلى سوائل على إنشاء مختبر توصيف الوقود في جامعة تكساس إي أند أم في قطر. وهو واحد من أكثر المختبرات المتقدمة في هذا المجال ويضم هذا المختبر أيضاً مختبراً في دعم عمليات والتوصيف الوقود الصناعي بهذه التكنولوجيا التي أنتجها قطر ومبرمجين آخرين من قطر. يقوم الباحثون في هذا المختبر بتصميم تركيبات جديدة للوقود والتحكمات والتحكمات لتقليل مخاطر التسمم الحفازي والكفاءة والموثوقية للوقود الصناعي والبتروكيماويات ذات القيمة المضافة التي تم إنتاجها من الغاز الطبيعي.

أوريكس جي. تي. أي برنامج التميز في تحويل الغاز إلى سوائل

تمتلك دولة قطر موارد هائلة من الغاز الطبيعي، كما يتواجد على أرضها أحدث المحطات وللصافي وأكثرها تطوراً في مجال تكنولوجيا تحويل الغاز إلى سوائل (GTL) والغاز الطبيعي للسائل (LNG)، بالإضافة إلى العديد من مصانع الكيماويات والبتروكيماويات.

وتحت هذه البيئة الفريدة جامعة تكساس إي أند أم في قطر على ترويج الخبرات وبمهندسين ذوي مهارات عالية يحتاجهم هذا القطاع لهم تطوير المنطقة والعالم وهذه برامج "أوريكس جي. تي. أي" برنامج التميز في تحويل الغاز إلى سوائل إلى إعداد مهندسين وأخصائيين على أحدث ما طوره من الهياكل الفريدة وشعير التكتك الصناعية رفيعة المستوى في دولة قطر.

الرسالة








هدف البرنامج إلى تعليم وإعداد الطلبة حول أبعاد فريدة عملياً ودرامياً في المجالات الصناعية والأكاديمية. واستغلال الطلبة للتطوير في الهندسة الكيميائية، بتجديد وتطوير المصانع بتبديده في أساليب ومعدات الهندسة الكيميائية وإيماناً في مجال تعليم الهندسة الكيميائية ومتخصصين. وأن يكون قاعدة ذات قيمة للموارد والمعدات، وكذلك لتوفير القيادة في حل المشاكل ذات الطبيعة الأكاديمية والاقتصادية.

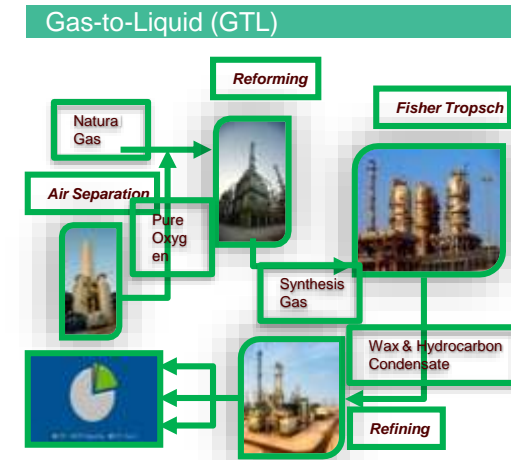
أهداف

برنامج عالي التأثير يعمل على إلهام الطلاب بتطوير الهندسة الكيميائية من خلال طرق ووسائل جديدة.

ORYX GTL SCHOOL & COMMUNITY ORIENTATION PROGRAMS

To support STEM program and orientation on natural gas roles in energy market

Fall 2016		
Arrazi Boys Preparatory school	Oct. 23,16	
AlWakrah Girls Preparatory school	Nov. 13,16	
Tariq bin Ziyad Secondary school	Nov. 27, 16	
Gharnata Girls Preparatory school	Nov. 27, 16	
Spring 2017		
Amna Bint Wahab Girls Preparatory school	March, 2017	
Rouda bnt Mohammed Secondary school	April , 2107	
Musab bin Omair Secondary school	May, 2017	



Energy and Fuels



ARRAZI BOYS PREPARATORY SCHOOL (AROUND 60 STUDENTS ATTENDED) OCTOBER 23, 2016



ALWAKRAH GIRLS PREPARATORY SCHOOL (AROUND 90 STUDENTS ATTENDED) NOVEMBER 13, 2016

مدرسة الواكراه الابتدائية المستقلة للبنات
Al Wakrah Independent Preparatory School For Girls



TARIQ BIN ZIYAD SECONDARY SCHOOL (AROUND 80 STUDENTS ATTENDED) NOVEMBER 27, 2016



GHARNATA GIRLS PREPARATORY SCHOOL (AROUND 90 STUDENTS ATTENDED) NOVEMBER 27, 2016



NEW GRADUATE AND UNDERGRADUATE COURSE

Chemical Engineering, CHEN 489-689 Gas and Petrochemicals Processing

Chemical Engineering and Petroleum Engineering, CHEN 459/ PETE 489 Midstream in Oil and Gas Industry and natural Gas Processing Treatment and Processes

Downstream



Refining & Supply
Efficient network to provide clean fuels, lubricants, and other high-value products

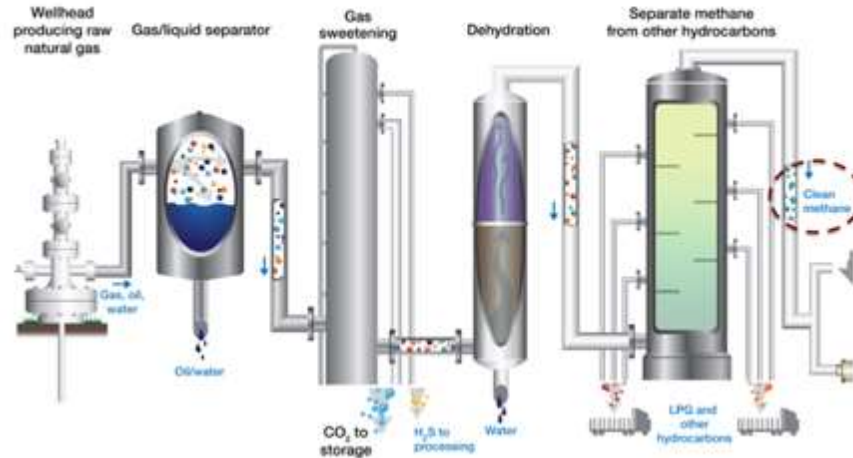


Fuels Marketing
Products sold to customers around the world



Lubricants & Specialties

Midstream Natural gas cleaning



Upstream



Exploration
Identify, pursue, capture, and evaluate high-quality exploration opportunities



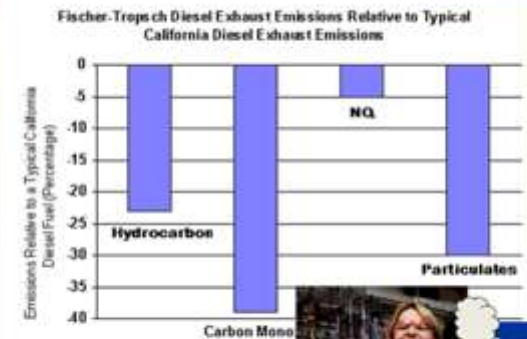
Development
Develop safe, cost-effective facilities for oil & gas fields identified by Exploration



Production
Oil and gas fields in production

GTL fuels environmentally attractive

Extremely low (0-5-ppm) sulfur, aromatics, and toxics



SPECIAL COURSE ON NATURAL GAS PROCESSING TECHNOLOGIES



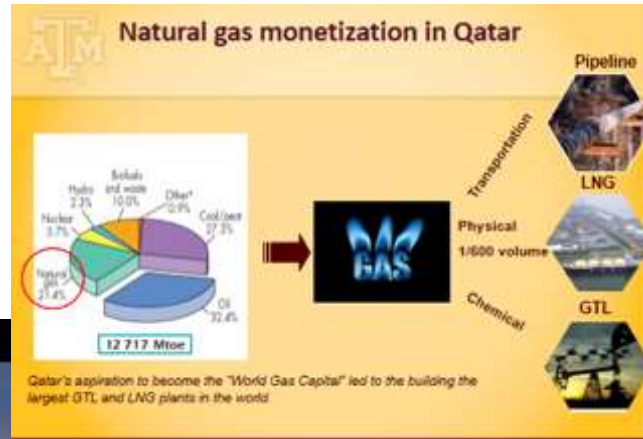
BLOCK I

Global Energy Market

Qatar's Energy Resources and Its Potentials

Dr. Nimir O Elbashir

Chemical Engineering, Texas A&M University at Qatar



Hamad bin Khalifa University's Executive Master in Energy and Resources



Block IV Catalysis and the Petrochemical Industry



ORYX GTL EXCELLENCE IN CHEMICAL ENGINEERING SEMINAR SERIES



Dr. Wolf Arlt

University of Erlangen
October 9, 2016
Safe and dense chemical storage of
renewal energy via the hydrogen
route: Liquid Organic Hydrogen
Carrier



Dr. Tobin J. Marks
Northwestern University

January 25, 2016
Heterogeneous meets
homogeneous catalysis:
Cooperative properties of
Electrophilic
Organometallic Ensembles



Dr. James Spivey
Louisiana State University

September 7, 2015
Development of high-
temperature Pyrochlore
catalysts for methane
conversion: Options for
reforming with **CO₂**



Dr. Michael R. Hoffmann
February 16, 2015

Development of
Integrated Reactor
Systems for the PV-
Powered Treatment of
Domestic Wastewater
Coupled with the
Simultaneous Production
of Molecular Chlorine and
Hydrogen



Dr. Rafigul Gani
The Technical University
of Denmark

November 27, 2014
A new paradigm for
chemical engineering



Dr. Mark Hotzapple
Texas A&M University
(TAMU)

November 12, 2014
Modified Claude process
for producing liquid
natural gas



Dr. Ali Cinar
Illinois Institute of
Technology (IIT).

October 19, 2014
Agent-Based
Techniques for Process
Modeling, Supervision &
Control



Dr. J W Niemantsverdriet
Syngaschem BV and
Eindhoven University of
Technology.

March 17, 2014
Mechanistic insight in
Fisher-Tropsch synthesis
catalysis from surface
science synchrotron &
computational studies



Dr. Doros Theodorou
National Technical
University of Athens
(NTUA)

March 16, 2014
Multiscale modeling of
polymer-matrix
nanocomposites



Dr. Roy Johnsen
Norwegian University of
Science and Technology
(NTNU)

February 27, 2014
Hydrogen embrittlement of
corrosion resistant alloys
in oil & gas environment

ORYX GTL EXCELLENCE IN CHEMICAL ENGINEERING SEMINAR SERIES





RESEARCH

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EFFICIENT DESIGN OF GTL AVIATION FUELS

NOOF ABDALLA, MSC STUDENT



Designing Fuel

- Computer Aided Model developed by DTU
- Composition of Shell Pearl Kerosine (SPK) along with additives are determined through the developed model and their relevant target properties are predicted



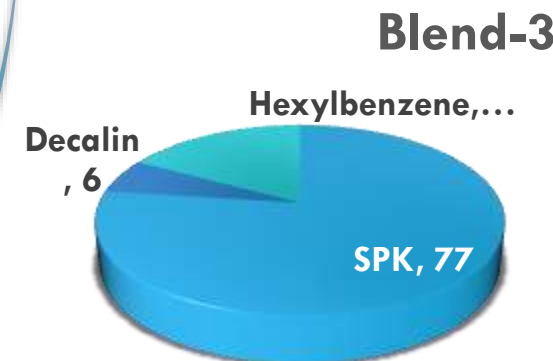
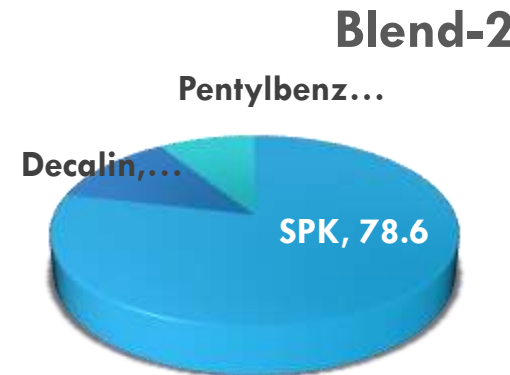
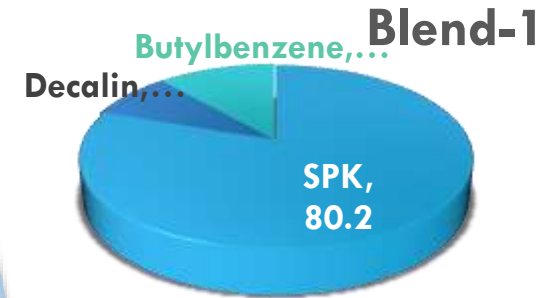
Blending to Prepare Surrogate Mixtures

- Blends of SPK prepared in FCL



Experimental Analysis According to ASTM Standards

- Different properties are to be tested, e.g: Lower Heating Value (LHV), Flash point, Reid Vapor Pressure (RVP), Density, Kinematic viscosity, Heat of Vaporization, and Heat of combustion.





TRAINING

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الهيئة العامة للغازات المسالة
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ELECTRICAL TRANSFORMERS AND SWITCHGEARS; FAULTS, INSPECTION, TESTING, MAINTENANCE AND TROUBLESHOOTING (SEPT 18-21, 2016)

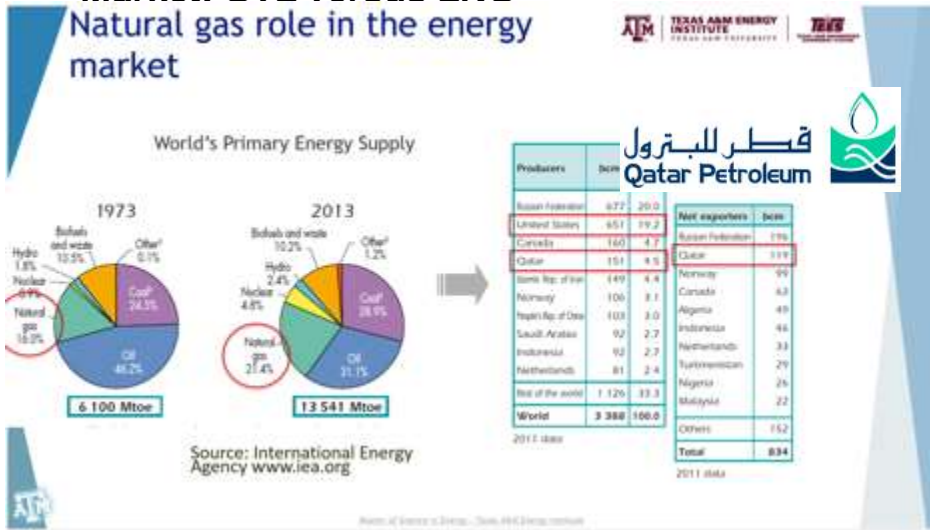
- This course introduces the principles of design, testing, operation and maintenance of transformers in power systems and provide the participants with the necessary knowledge on the power and distributed transformers typically used for oil and gas industry.
- This course has been designed to provide participants with an understanding of the proper construction, operation, and maintenance of power transformers, while emphasizing on the technology related to power transformers used within the industry power systems.
- Four ORYX GTL technical staff have been sponsored by the program



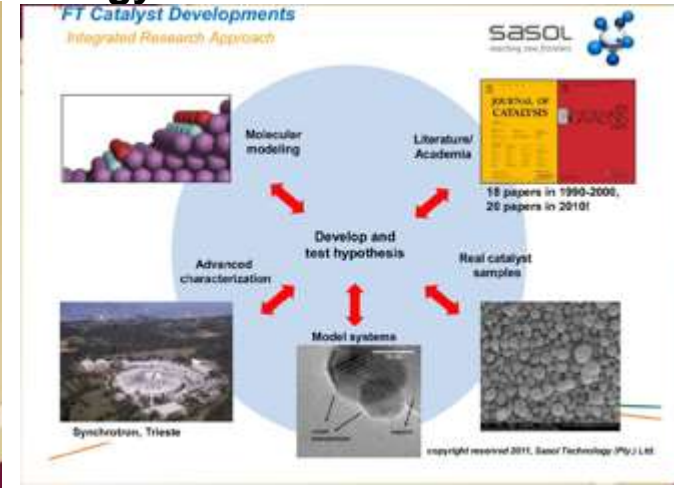
SPECIAL COURSE FOR ORYX GTL (ATTENDED BY 15) FUNDAMENTALS OF GAS-TO-LIQUID & ORYX GTL PLANT OCTOBER 26, 2016

Session I: Natural Gas Processing and Its Importance to the Energy Market: GTL versus LNG

Natural gas role in the energy market



Session II: Sasol's Gas-to-Liquid Technology



Session III: Environmental Impact of GTL Transportation Fuels



Session V: Lab Session



Session VI: Visualization of the ORYX GTL Plant

